

B2

Ohmic layer 12A is at least one layer that provides a good ohmic contact to the semiconductor 11. A good ohmic contact has minimal voltage drop (linear I-V, where "I" is current and "V" is voltage) across the semiconductor/metal interface when current flows across it. A figure of merit for contacts is their specific contact resistance. The specific contact resistance varies greatly depending on the semiconductor and contact material, but a good ohmic contact should have a specific contact resistance of less than $10^{-2} \Omega\text{-cm}^2$. The ohmic layer 12A, which may be optionally alloyed to the semiconductor surface, is thin to minimize the absorption to less than 25% of the light generated in the semiconductor device 10 while being thick enough so that the specific contact resistance is less than $10^{-2} \Omega\text{-cm}^2$. The composition of the ohmic layer 12A depends on the material system used for the semiconductor structure 11. The thickness of the ohmic layer 12A depends upon on how the specific contact resistance increases as the layers are thinned.

In accordance with 37 CFR §1.121(b)(1)(iii), Attachment A contains marked up versions of the replacement paragraphs illustrating the newly introduced changes in the specification.

IN THE CLAIMS

The following is a clean version of the entire set of pending claims. The present submission cancels Claims 2 and 12, and amends Claims 1, 4, 6, 7, 9, 11, and 14-18 to read as indicated below. In accordance with 37 CFR §1.121(c)(1)(ii), marked up versions of the amended claims containing the newly introduced changes are included in Appendix B attached below.

- B3
1. (Twice Amended) A light-emitting device comprising:
a semiconductor heterostructure including at least one p-type layer and one n-type layer; and
a p contact and an n contact, the p contact electrically connected to the p-type layer, the n contact electrically connected to the n-type layer, wherein at least one of the p and n contacts is a multi-layer contact external to the semiconductor heterostructure and including a metallic reflector layer and a continuous conductive layer that makes ohmic contact to the heterostructure;
wherein the multi-layer contact has a reflectivity greater than 75% for light at an operating wavelength of the light-emitting device.

LAW OFFICES OF
SKJERVEN MORRILL
MACPHERSON LLP

25 METRO DRIVE
SUITE 700
SAN JOSE, CA 95110
(408) 453-9200
FAX (408) 453-7979

3. A device, as defined in claim 1, wherein the multi-layer contact has a specific contact resistance less than $10^{-2}\Omega\text{-cm}^2$.

4. (Amended) A device, as defined in claim 1, the multi-layer contact further comprising a barrier layer interposing the reflector layer and the conductive layer.

5. A device, as defined in claim 1, wherein the reflector layer has a thickness greater than 500Å.

6. (Amended) A device, as defined in claim 1, wherein the conductive layer that makes ohmic contact to the heterostructure has a thickness less than 200 Å.

7. (Amended) A device, as defined in claim 1, wherein the reflector layer is selected from the group consisting of Al, Cu, Rh, Pd, and Au.

8. A device, as defined in claim 1, wherein the p and n contacts are on opposing faces of the heterostructure.

9. (Amended) A device, as defined in claim 8, wherein the conductive layer that makes ohmic contact to the heterostructure includes Ni and Ag.

10. A device, as defined in claim 8, wherein the reflector layer is Ag.

11. (Twice Amended) A light-emitting semiconductor device comprising:
a GaN-based semiconductor heterostructure having at least one p-type and one n-type layer; and
a p contact and an n contact, the p contact electrically connected to the p-type layer, the n contact electrically connected to the n-type layer, wherein at least one of the p and n contacts is a multi-layer contact external to the semiconductor heterostructure and including a metallic reflector layer and a continuous conductive layer that makes ohmic contact to the heterostructure;

LAW OFFICES OF
SKJERVEN MORRILL
MACPHERSON LLP

25 METRO DRIVE
SUITE 700
SAN JOSE, CA 95110
(408) 453-9200
FAX (408) 453-7979

B2
Lined

wherein the multi-layer contact has a reflectivity greater than 75% for light at an operating wavelength of the light-emitting device.

13. A device, as defined in claim 11, wherein the multi-layer contact has a specific contact resistance less than $10^{-2} \Omega\text{-cm}^2$.

SUB
D6

14. (Amended) A device, as defined in claim 11, the multi-layer contact further comprising a barrier layer interposing the reflector layer and the conductive layer.

15. (Amended) A device, as defined in claim 11, the reflector layer having a thickness greater than 500 Å.

B3
Cmld
SUB
D7

16. (Amended) A device, as defined in claim 11, the conductive layer that makes ohmic contact to the heterostructure having a thickness less than 200 Å.

17. (Amended) A device, as defined in claim 11, the reflector layer being selected from the group consisting of Al, Cu, Rh, Pd, and Au.

SUB
D8

18. (Amended) A device, as defined in claim 11, wherein the conductive layer that makes ohmic contact to the heterostructure is selected from the group that consists of Ti, Au/NiO, and Ni/Au.

LAW OFFICES OF
SKJERVEN MORRILL
MACPHERSON LLP

25 METRO DRIVE
SUITE 700
SAN JOSE, CA 95110
(408) 453-9200
FAX (408) 453-7979